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panded and delicate gametophyte. When the sporophyte had largely assumed this function of the gametophyte, and by the development of absorbing organs in the soil was enabled to live an independent existence, it became gradually established, as conditions changed, in situations where the gametophyte could not exist. It has thus become the dominating vegetative feature of most land areas, while the gametophyte in these higher forms, has become an organ entirely dependent upon the sporophyte for nourishment, or has been developed into an organ to serve a secondary purpose in the nourishment of the sporophytic embryo.

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## PROGRESS IN AMERICAN ORNITHOLOGY.

1886-1895.

BY R. W. SHUFELDT, M. D.

What I have to say here in reference to the progress in American ornithology for the past nine or ten years is prompted by the recent appearance of the second edition of *The A. O. U. Check-List of North American Birds*. Most naturalists are familiar with the first edition of this work, it having been published in 1886. It was officially promulgated by the American Ornithologists' Union, and zoologists the world over have carefully considered "The Code of Nomenclature" that formed a part of the volume. Moreover, it contained a List of North American Birds which had been prepared according to the aforesaid Code of Rules, and *classified* in accordance with the views of the majority of the committee appointed by the Union to prepare it. In so far as the orders and families of this classification were concerned, the arrangement could be appreciated at a glance by reference to the Table of Contents of the book, and, as for the List itself, it not only was intended to represent the nomenclature of the Birds, but "a classification as well" (p. 15). At the close of the volume was presented a "Hypothetical List" to which had been referred those species and subspecies the zoological status of which could not be satisfactorily determined; and following this was a list of the fossil species of North American birds.

As the years passed by a second edition of this book was

eagerly looked for by zoologists at large, but it did not make its appearance until towards the close of December, 1895. It comes to us in the same form as its predecessor, but it does not appear to be as substantially bound or printed upon as good paper. Apart from the substitution of one member of the committee for another, it is likewise gotten out under precisely similar auspices, plans, objects and general arrangement. From it, however, has been omitted the "Code of Nomenclature," but in it are included all the new existing and fossil birds known to the committee, and which were not in the first edition of the Check-List. For this and minor changes it has but 372 pages against 392 of the original volume. In its preface it contains "extracts from the Introduction to the Code of Nomenclature," intended to serve "to explain the scope and plan of the Check-List, including the method of incorporating additions."

The second edition, then, of this work may be taken as setting forth the progress in North American ornithology as understood by a committee appointed by the American Ornithologists' Union, and for a period extending between the years 1886 and 1895 inclusive. In considering this from such a standpoint, let us first take into account the number of species and subspecies added to, or subtracted from, the List of 1886, in connection with other changes, and the same for the "hypothetical list" and for the "fossil birds." After this I will consider what improvements, if any, have been made in the matter of classification.

Designating the two volumes simply by the years of their publication, as 1886 and 1895 respectively, we find that in the first group of birds presented, or the Order PYGOPODES, there were included, in 1886, 33 species and 4 subspecies, while in 1865 but 32 species are given and 4 subspecies, the change being due to the omission of *Synthliboramphus wumizusume* (Temminck's Murrelet, No. 22).

In 1886, the Great Auk (*Plautus impennis*, No. 33) was "Believed to be now extinct," while in 1895 it is confidently asserted to be "Now extinct." This being the case, we would like to inquire what place has it in a list of the *existing* birds of this or any other country? It is simply absurd to include birds that have *no existence* in nature in a list of living forms.

Passing to the second group, or Order LONGIPENNES, we find upon comparison that in 1886 it contained 44 species and 4 subspecies, while in 1895 it is seen to contain 46 species and 4 subspecies. The additions here are the two new species *Larus barrovianus* and *Larus minutus* (a straggler). Another change in this group is the calling Pallas's Gull (*Larus cachinnans*, No. 52) the Vega Gull (*Larus vegæ* [1895]).

In the third group, or the Order TUBINARES, were included, in 1886, 31 species and 3 subspecies, to which list was added a new species in 1895 (*Oceanodroma macrodactyla*), making 32 species and 3 subspecies for that year. Peale's Petrel (*Estrelata gularis*) (No. [99]), was likewise changed to the Scaled Petrel (*Æ. scalaris*) in this group.

In 1886, the fourth group, or the Order STEGANOPODES, was made to contain 17 species and 5 subspecies, and, in 1895, 19 species and 5 subspecies, the increase being due to the addition of the two new species of Gannets, *Sula gossi* and *S. brewsteri*.

Coming to the fifth group, or the Order ANSERES, there were contained in it in the 1886 List, 51 species and 6 subspecies, and, in the 1895 List, 51 species and 8 subspecies, the change being effected as follows: *Anas fulvigula maculosa*, the Mottled Duck, was added as a new subspecies, and *Somateria mollissima* was made the subspecies *S. m. borealis*; finally, *Chen cærulescens* was included in the list. *Camptolaimus labradorius* now being "extinct," it has no place in the List and ought not to appear there.

Group six, the Order ODONTOGLOSSÆ, remains the same, each List having the 1 species of Flamingo (*P. ruber*).

In the seventh group, or the Order HERODIONES, there were to be found 19 species and 2 subspecies, to which were added in the 1895 List a new species and a new subspecies (*Ardetta neoxena* and *Ardea virescens frazari*). *Botaurus exilis* becomes in the new List *Ardetta exilis*, and *Ardea rufa* becomes *A. rufescens*, while the "subgenus" *Nyctherodius* is changed to *Nyctanassa*.

The Order PALUDICOLÆ (eighth group) in the 1886 List, contained 17 species and 3 subspecies, to be changed in the 1895 List to 21 species with only 1 subspecies. This was effected by considering the subspecies *Rallus longirostris crepitans* (1886) to be the species *Rallus crepitans*, and adding also to the 1896

List the species *Rallus scottii* and *Rallus longirostris caribæus*. The subspecies *Porzana jamaicensis coturniculus* (1886) became the species *P. coturniculus* (1895). From these changes a less important one is to be noted, viz.: *Rallus longirostris saturatus* became, in 1895, *R. crepitans saturatus* (No. 211 a).

Passing to the Order LIMICOLÆ (ninth group), it is to be noted that in the List of 1886 there were included 66 species and 4 subspecies, and in 1895 these became 68 species and 6 subspecies, the changes being the addition of *Tringa damacensis* (a straggler); the two subspecies *Totanus solitarius cinnamomeus* and *Symphemia semipalmata inornata*, and the new species *Hæmatopus frazari*. Other changes in this group are the subgenus *Rhyacophilus* (1886) to read the subgenus *Heladromus*, and the name of the Mexican Jacana, instead of being *Jacana gymnotoma* (Wagl.), is now *J. spinosa* (Linn.).

Coming next to the Order GALLINÆ (tenth group), it is to be seen that in the 1886 List 22 species are given and 18 subspecies, while in 1895 there are 21 species and 22 subspecies. This reduction in the number of species was caused by the dropping out of *Colinus graysoni*, while the subspecies were increased by adding to the List *Oreortyx pictus confinis*, *Tympanuchus americanus attwateri*, and the two Turkeys, *M. g. osceola* and *M. g. ellioti*. *Callipepla gambeli* of the old work was corrected to read *C. gambelii*.<sup>1</sup>

In the eleventh group, or the Order COLUMBÆ, there were included in the List of 1886 12 species and no subspecies. In the 1895 List we find but 11 species, while 4 subspecies have been added. *Columba fasciata vioscæ* was recognized, while *Engyptila albifrons* (1885) became *Leptotila fulviventris brachyptera*. There was also added the subspecies *Columbigallina passerina pallescens* and the species *Columbigallina passerina* has become the subspecies *C. p. terrestris*.

There appeared 53 species and 29 subspecies in the twelfth group or Order RAPOTRES in 1886, while in 1895 these were increased to 54 species and 37 subspecies. In this group the

<sup>1</sup> In making these comparisons it is to be understood that they are direct between the Check-List of 1886 and that of 1895, and that the seven supplements (1889-94) and the Abridged Edition of 1889 are not taken into consideration. The second edition (1895) is taken to be the final finding of the Committee.

changes to be noted are first the addition of the subspecies *Buteo borealis harlani* (337 d) and the omission of *Buteo harlani* (338, 1886). *Buteo albicaudatus* becomes the subspecies *B. a. sennetti*; the subgenus TACHYTRIORCHIS being introduced between Nos. 340 and 341 in the genus *Buteo*. *Falco regulus* is added to the list (a straggler in Greenland). *Falco sparverius deserticolus* and *F. s. peninsularis*, two new subspecies of Sparrow Hawks, are also added, and *Falco sparverioides* is changed to *F. dominicensis*. *Falco tinnunculus* is also added to the 1895 List as a straggler. *Megascops asio mcallii* is now determined to be *M. a. trichopsis*; while *M. a. trichopsis* of the 1886 List now becomes *M. a. cineraceus* of 1895. Again the generic name *Uhlula* is set aside for that of *Scotiaptex* of Swainson. There are also added *Megascops a. aikenii*, *M. a. macfarlanei*, *M. a. idahoensis* and *Glaucidium g. californicum* as new subspecies, and also the new species *Glaucidium hoskinsii*. The genus of Elf Owls formerly in the genus *Microathene* have had that name replaced by *Micropallas*. The Order PSITTACI (13th group,) remains identical in the two Lists, having but the 1 species, the Carolina Parakeet.

Following these we have the fourteenth group or COCCYZES, an Order containing the Cuckoos, Trogons and Kingfishers. All told, in 1886, there were 9 species of these, and, in 1895, 9 species and 4 subspecies. These latter consist of 3 Cuckoos (*Coccyzus minor maynardi*, *C. americanus occidentalis* and *Cuculus canorus telephonus*), also the Texas Kingfisher (*Ceryle a. septentrionalis*). This latter was formerly *Ceryle cabanisi*. In the 1895 List *Ceryle torquata* is added [390. 1].

Next we come to the Order PICI (15th group), in which there were 23 species and 11 subspecies in 1886, which, in the 1895 List, stand as 22 species and 14 subspecies. Upon comparing the records we find that *Dryobates villosus hyloscopus* has been added as a subspecies, and also *Dryobates pubescens oreaceus*. *Dryobates scalaris* becomes *D. s. bairdi*, while *Dryobates stricklandi* is replaced by *D. arizonæ*.

That "highly polymorphous Order," the MACROCHIRES (16th group), containing the Goatsuckers, Swifts, "etc.," presented in the 1886 List, 26 species and 3 subspecies. In the present vol-

ume (1895) it is seen to include 26 species and 7 subspecies. The following alterations, subtractions, and additions have been made in the interim. *Antrostomus vociferus arizonæ* becomes *A. v. macromystax*. The genus *Phalænoptilus* has two new subspecies, *P. n. nitidus* and *P. n. californicus*. *Chordeiles v. minor* becomes *C. v. chapmani*, and *Chordeiles texensis* becomes *C. acutipennis texensis*. The genus of Swifts formerly in *Micropus* are now in *Aëronautes*. We have but one species of it in this country—the White-throated Swift, which, known formerly as *Micropus melanoleucus*, now is written *Aëronautes melanoleucus*. Among the Hummingbirds we have the new species *Trochilus violajugulum*, *Trochilus costæ* is changed to *Calypte costæ*, and *T. anna* to *Calypte anna*, in other words, the subgenus CALYPTE has been raised to the rank of a genus. So likewise the subgenus SELASPHORUS has been similarly dealt with, and another species added to it, viz.: *Selasphorus floresii*. Also the subgenera STELLULA and CALOTHORAX become genera, each containing a single species. *Trochilus heloisa* has been omitted from the list, and *Basilinna leucotis* added to it.

Finally, we come to the last, or seventeenth group, that vast assemblage known as the PASSERES. It will not be as convenient to deal with these as the foregoing sixteen groups were dealt with, as many of the families contain more birds than several of the other "Orders" combined, so I shall resort to tabulating the comparisons, comparing family with family.

This comparison goes to show that in 1886 there were recorded 313 species of North American *Passeres*, and, in 1895, 321, giving a gain of 8 species for the nine years, while, for the same years and interval of time, there were 117 subspecies, and, in 1895, 185, showing a gain of 68 subspecies.

With respect to the *Cotingidæ*, the single species indicated in the above Table is Xantus's Becard (*Platypsaris albiventris*). Among the *Tyrannidæ* the following changes were made: (1) The new subspecies *Myiarchus cinerascens nuttingi* was added, and also (2) the subspecies *Contopus richardsonii peninsulæ*; (3) the species *Empidonax cineritius* is added, and (4) *Empidonax acadicus* becomes *E. virescens*, as does (5) *E. pusillus* become *E. trailli*, and (6) *E. trailli alnorum* (1895) has taken the place of

TABLE COMPARING THE PASSERES.

Families.	1886.		1895.		Remarks.
	Sp.	Subsp.	Sp.	Subsp.	
CLAMATORES.					
Cotingidæ.....			1		This family not in the 1886 list.
Tyrannidæ .....	29	7	32	9	
OSCINES.					
Alaudidæ.....	2	7	2	10	
Corvidæ .....	15	9	17	13	
Sturnidæ.....	1	0	1	0	(Sturnus vulgaris).
Icteridæ.....	19	7	19	8	
Fringillidæ.....	87	44	87	71	
Tanagridæ.....	5	1	6	1	(Piranga rubiceps).
Hirundinidæ.....	7	0	10	1	
Ampelidæ .....	3	0	3	0	
Laniidæ .....	2	1	2	2	(L. l. gambeli).
Vireonidæ.....	11	5	11	9	
Cœrebidæ.....	1	0	1	0	
Mniotiltidæ.....	57	9	57	13	
Motacillidæ.....	6	1	6	1	No changes.
Cinclidæ.....	1	0	1	0	No changes.
Troglodytidæ .....	24	7	24	16	
Certhiidæ.....	0	2	0	4	
Paridæ.....	19	9	20	15	
Sylviidæ .....	7	1	7	2	Poliophtila cærulea obscura added.
Turdidæ.....	15	7	14	10	
Total.....	313	117	321	185	

*E. pusillus trailli*; (7) *E. obscurus* (1886) becomes *E. wrightii*, and, finally, (8) *Empidonax griseus* appears as a new species.

In the family *Alaudidæ*, three new subspecies of "Horned Larks" are added to the List (*O. a. adusta*, *merrilli* and *pallida*).

In the family *Corvidæ* we have *Cyanocitta stelleri annectens* added as a subspecies, and *Aphelocoma cyanotis* as a species. In this genus occur also *A. californica hypoleuca*, *A. c. obscura* and *A. insularis*. A new subspecies of Raven is also recognized (*C. c. principalis*). Finally, and very properly, the generic name *Picicorvus* is replaced in the 1895 List by *Nucifraga* of Brisson.



Among the *Icteridæ* I note that *Dolichonyx o. albinucha* (1886) has been omitted, and that the genus *Callothrux* of Cassin has been adopted and made to contain *C. robustus*, which was formerly *Molothrus æneus* (1886). The subspecies *Agelaius phoeniceus sonoriensis* and *A. p. bryanti* have been added.

The largest of all the passerine groups of birds is the family *Fringillidæ*. The following synopsis will show the changes that have been made in it since 1886:

#### SPECIES ADDED.

*Junco ridgwayi*.  
*Junco townsendi*.  
*Melospiza insignis*.  
*Euetheia canora*.

#### SPECIES OMITTED.<sup>1</sup>

*Carpodacus frontalis*.  
*Zonotrichia intermedia*.  
*Zonotrichia gambeli*.  
*Sporophila moreletii*.

#### SUBSPECIES ADDED.

*Coccothraustes vespertinus*<sup>2</sup>  
*montanus*.  
*Carpodacus mexicanus frontalis*.  
*Carpodacus mexicanus ruberrimus*.  
*Spinus tristis pallidus*.  
*Plectrophenax nivalis townsendi*.  
*Poocætes gramineus affinis*.  
*Ammodramus henslowii occidentalis*.  
*Ammodramus caudacutus subvirgatus*.

*Ammodramus maritimus peninsulæ*.

*Ammodramus maritimus sennetti*.

*Zonotrichia leucophrys intermedia*.

*Zonotrichia leucophrys gambeli*.

*Spizella pusilla arenacea*.

*Junco hyemalis shufeldti*.

*Junco hyemalis thurberi*.

*Junco hyemalis pinosus*.

*Junco hyemalis carolinensis*.

*Amphispiza belli cinerea*.

*Melospiza fasciata rivularis*.

*Melospiza fasciata graminea*.

*Melospiza fasciata clementæ*.

*Pipilo fuscus senicula*.

*Cardinalis c. canicaudus*.

*Pyrrhuloxia sinuata beckhami*.

*Pyrrhuloxia sinuata peninsulæ*.

*Guiraca cærulea eurhyncha*.

*Passerina versicolor pulchra*.

*Sporophila moreletii sharpei*.

#### SUBSPECIES OMITTED.

*Carpodacus frontalis rhodocolpus*.

<sup>1</sup> So long as the geographical range of a species is extended it makes not an iota's difference how that extension has been accomplished, whether it has been through human agency ("introduction"), or by other means, for when the bird becomes thoroughly established in sufficient numbers, and breeds, it is entitled to a place in any List presenting the ornithology of the country into which it has come.

The Starling (*Sturnus vulgaris*) essentially gained a place and recognition, in the A. O. U. "List" from the fact that it has been successfully "introduced" from abroad. If this be granted, the Committee were guilty of very unscientific practice when they omitted the English Sparrow (*Passer domesticus*) from the "List," (also *Passer montanus*), and it can only stand as an example of how far men will allow their prejudices to carry them, and blind their scientific instincts.

<sup>2</sup> Spelled "*vespertina*" in 1886 edition.

Between the species *Carpodacus cassini* and the subspecies *Carpodacus mexicanus frontalis*, the subgenus BARRICA is introduced.

*Progne subis hesperia* has been added to the Swallows (*Hirundinidæ*), as well as *Progne cryptoleuca*, and *Petrochelidon fulva* as a straggler. The Bahaman Swallow (*Callichelidon cyaneoviridis*) having accidentally occurred on the Dry Tortugas, it introduces both the species and genus to which it belongs.

To the *Vireonidæ* were added *V. s. alticola* and *V. s. lucasanus*, as well as *V. n. maynardi* and *V. huttoni obscurus*.

In the case of the family Cœrebidæ, the genus *Certhiola* is superseded by *Cœreba*, and consequently *Certhiola bahamensis* becomes *Cœreba bahamensis*.

But few changes are noticeable among the Mniotiltidæ, and these principally the addition of new subspecies. The Dusky Warbler (*Helminthophila celata sordida*) is one of these, *Dendroica æ. sonorana*, *Geothlypis trichas ignota* and *Geothlypis poliocephala ralphi* being the others.

To the family Troglodytidæ there are to be noted a number of additions and some few changes. They may be shown thus:

1886.

1895.

*Harporhynchus longirostris* = *H. l. sennetti*.

Subsp. added.

*Harporhynchus cinereus mearnsi*.

Genus *Campylorhynchus* = Genus *Heleodytes*.

*C. brunneicapillus* = *H. brunneicapillus*.

Subsp. added.

*H. b. bryanti*.

714. *C. affinis* = Omitted.

Subsp. added.

713 b. *H. b. affinis*.

*Catherpes mexicanus punctulatus*.

*Thryothorus ludovicianus lomitensis*.

Species added.

*Thryothorus leucophrys*.

*Thryothorus brevicaudus* = *T. brevicauda*.

Subsp. added.

*Troglodytes ædon aztecus.*

*Cistothorus palustris paludicola.*

*Cistothorus palustris griseus.*

Sp. added.

*Cistothorus marianæ.*

In the Certhiidae, *Certhia familiaris mexicana* becomes *C. f. alticola*, and *C. f. montana* and *C. f. occidentalis* are added as new subspecies.

Among the Nuthatches and Tits (*Paridae*) the following additions and changes are to be noted.

1886.

1895.

Subsp. added.

*Sitta carolinensis atkinsi.*

*Sitta pygmæa leuconucha.*

*Parus bicolor texensis.*

Subgenus PARUS inserted.

*Parus carolinensis agilis.*

*Parus hudsonicus stoneyi.*

*Parus hudsonicus columbianus.*

Species added.

*Psaltiriparus santaritæ.*

[745] *P. mlanotis*

= *Psaltiriparus lloydi.*

Finally, among the family *Turdidae*, we have :

1886.

1895.

*Turdus f. salicicolus*

= *T. f. salicicola.*

*Sialia mexicana*

= *S. m. occidentalis.*

Subspecies added.

*Sialia mexicana bairdi.*

*Sialia m. anabelæ.*

I am now prepared to present some comparisons with respect to the numbers of species and subspecies in 1886 and 1895, and these may be best shown again by means of a Table, as follows :

TABLE.

GROUP.	Recorded in 1886.		Recorded in 1895.	
	Sp.	S. sp.	Sp.	S. sp.
Pygopodes.....	33	4	32	4
Longipennes.....	44	4	46	4
Tubinares.....	31	3	32	3
Steganopodes.....	17	5	19	5
Anseres.....	51	6	51	8
Odontoglossæ.....	1	0	1	0
Herodiones.....	19	2	20	3
Paludicolæ.....	17	3	21	1
Limicolæ.....	66	4	68	6
Gallinæ.....	22	18	21	22
Columbæ.....	12	0	11	4
Raptores.....	53	29	54	37
Psittaci.....	1	0	1	0
Coccyges.....	9	0	9	4
Pici.....	23	11	22	14
Macrochires.....	26	3	26	7
Passeres.....	313	117	321	185
Grand total.....	738	209	755	307

This table will go to show that taking the species and subspecies together in 1886, they amounted to 947, while in 1895 there were no less than 1062. In subtracting the number of species recorded in 1886 from those in 1895, we find that there has been a gain of 17 species, and in dealing with the subspecies in the same manner, we find that there has been a gain of 98 subspecies. A study of this table is interesting in other ways, as the making of similar comparisons of any single group, or those groups exhibiting the greatest increase and the causes therefor; but all such data can be easily appreciated by the reader from what has been given above, and my space will not admit of enlarging upon it here.

For a moment we may now turn to the "Hypothetical Lists" of the two editions of the work I have under consideration. In 1886 there were 26 species and subspecies relegated to its hypothetical list, ranging from 1 to 5 for the families in which they occurred. In 1895, *Diomedea exulans* is seen to be added

to the number, while *Chen caerulescens* is considered to belong to our avifauna, and has therefore been added to the list of 1895. The Swallow-tailed Gull, given as *Creagrus furcatus* in 1886, is now *Xema furcata*, and nine examples of it are said to be known to science, instead of only three, as reported in 1886. *Numenius arquatus* and *Chordeiles v. sennetti* are also added to the hypothetical list of 1895, while *Buteo fuliginosus* is ignored entirely.

Coming at last to the "List of Fossil Birds of North America," we find that as compared with the existing species, a greater number has been added to those previously known than there has been to the list of living birds. In 1886 there were 46 species of fossil birds reported, while in 1895 there were 64 upon the record. No doubt there are others that should have been added to these, overlooked by the Committee, as, for example, the rail-like bird called *Crecooides osbornii* Shufeldt, from the Upper Cenozoic of the staked plains of Texas. Marsh increased the list of Cretaceous Birds by the addition of three species, and the Tertiary Birds by one species, while Shufeldt added no less than fourteen new species of fossil birds as belonging to this latter geological horizon.

To this list should also have been added those belonging to the "Recent Era," as, for example, *Plautus impennis*—the Great Auk—and *Camptolaimus labradorius*—the Pied Duck. Of the first named species there is an abundance of subfossil material in existence, and of the latter there are doubtless bones to be found in the dried skins of specimens in museums and elsewhere. Both birds are quite as extinct as is the famous Jurassic bird, the *Archæopteryx* of the Solenhofen States of Bavaria.

But the addition of new birds to the avifauna of any country is by no means all there is to ornithology. Nor does the science see its end when these new forms have been described, figured and printed in an official list. The importance of giving a new bird a name, recording its superficial characters, and defining its geographical distribution is not to be underrated, the more especially so as all this greatly helps those who are engaged with the science of their morphology, their taxonomy, and their present affinities and past origin. One of the chief

aims of ornithology is to establish the true relations of existing and extinct forms of birds to each other, and to other groups of animals that are either to be found living at the present time, or else have existed during past ages of the earth's history. In other words, the true classification of birds is to be sought for, and ornithology in this sees its most difficult problem and its final goal.

But the knowledge of the origin of this most perplexing group of vertebrates, their evolution, and our power to correctly classify them can only come to us in one way, and that is through a complete understanding of their structure, and a comprehension of the anatomy of those groups more or less nearly related to them. Other departments, however, can lend great assistance here, and the avian taxonomist can have much light thrown upon his arduous task through the revelations of researches in the fields of physiology, of geographical distribution, nidology, paleontology, and other biological sciences.

With these facts before us, it is with no little interest that the taxonomist scans the pages of the second edition of "The A. O. U. Check-List of North American Birds," with the view of ascertaining what evidences there may be in the direction of a better knowledge of the classification of our birds. There may have been some excuse for the numerous symptoms of the somewhat antiquated taxonomy that characterized the arrangement of North American birds in the 1886 edition of the A. O. U. Check-List, but not so this last one, provided we find that the earlier classification has been retained. For, be it known, in the meantime, that is, from 1886 to 1895, the avian morphologists had not been idle. There were very many useful suggestions in the admirable work done by Dr. Stejneger that appeared shortly before the 1886 edition was printed. This was followed, in 1888, by the superb volumes of Fürbringer, with one of the most elaborate classifications of birds the world has ever seen; Seebohm, of England, had done a great deal, while the present writer had published accounts of the osteology of nearly every family of N. American Birds, and Mr. Lucas stands prominent in his excellent anatomical work upon many of the groups. English pens had contributed memoir after

memoir along similar lines, and one has but to turn to the essays and volumes of Newton, Gadow, Beddard, T. J. Parker, Sharpe and many others to appreciate this. But for one to fully know what a deal was done during the nine years I speak of, it is but necessary to read the enthusiastic address of Fürbringer given before the Section for the Anatomy of Birds at the Second International Ornithological Congress, held at Budapesth in 1891. A powerful light has been thrown upon the structure and affinities of the various groups of birds, and has it in any way affected the classification of the 1895 Check-List of North American Birds, that is, in so far as the main groups are concerned? Not in the least. Apart from the addition to the List of the family *Cotingidæ*, the taxonomy of the orders and families as given in 1886 are identical with the arrangement repropounded in 1895. For example, we still find the Grebes, Loons and Auks retained together in the Order PYGODES, with the first-named separated from the last two by subordinal lines; whereas, Fürbringer, Thompson, Sharpe, myself and others, all of whom have examined the structure of these birds, have shown the affinity existing between the Grebes and Loons, and that these two families are very distinct from the Auks. The Auks, in fact, occupy a group by themselves, and are more nearly related to the Longipennes. Fürbringer separated them very widely from the Grebes and Loons, in which opinion Sharpe and others concur. That the Longipennes and the Limicolæ are akin is now generally recognized by those who have studied the anatomical structure of the members of the two groups, yet in the A. O. U. classification, six entire Orders stand between the Gulls and the limicoline assemblage. Fürbringer makes a "Gens" Laro-Limicolæ, and Sharpe keeps the two groups close together. As long ago as 1867 Professor Huxley clearly showed the osteological agreement between the skull of a Plover and that of a Gull.

That the Fowls (*Gallinæ*), Pigeons (*Columbæ*), Raptorial Birds (*Accipitres*), Parrots (*Psittaci*) and the Cuckoos (*Coccyges*) as groups should stand in lineal series I can well believe—but as Gadow, Hubert Lyman Clark, myself and others have frequently pointed out, the Owls do not belong with the Acci-

pitres or the Falcons and their kin, while I make separate groups for the Cuckoos, Kingfishers and Trogons. The Woodpeckers are not separated from the Passeres by the Goatsuckers, Swifts, and Hummingbirds, as the A. O. U. List now have them arranged, but the Woodpeckers, in the list of North American Birds, taxonomically arrayed, should stand immediately next to the Passeres, while the "Macrochires" is a thoroughly unnatural group, inasmuch as birds are no longer classified and restricted to groups on account of their having long pinions.

Finally we come to the *Passeres* with the lineal arrangement of the 21 families composing the group. Now, as a classificatory scheme, this lineal method of showing it is unsatisfactory in the extreme, but it appears to be the only available one to adopt in the Lists in books. A "tree" shows what is meant much better and truer, but it can never form a part of a List. Still these Lists show something, for we can, among other things, indicate in them the families that should, in our opinions, occupy the extremes—as, for instance, the *Tyrannidæ* and the *Corvidæ*, but in numerous cases it will be found to be exceedingly difficult to complete the sequence, even to carry out the hopes of the classifier. However, marked violences can usually be avoided, and marked affinities often shown in a classification of this kind.

The scheme adapted in the A. O. U. Check-List, although not altogether a bad one, is capable of showing a more truthful arrangement of the families of passerine birds. In the first place, this List should be completely reversed; then the Thrushes (*Turdidæ*) placed more nearly where they belong; and the *Laniidæ* removed very much nearer the Clamatorial end of the sequence, and away from the Vireos, with which family they have no special affinity. Thus much for the progress in American ornithology during the past ten years; our ornithology has been most carefully studied in so far as the identification of new species and subspecies is concerned, but the matter of scientific classification of birds demands increased attention, and it is to be hoped that a greater number of avian morphologists will arise, and should that come about, the clas-



sification of the next edition of the A. O. U. Check-List will, in truth, be archaic if again printed without change; the 1895 one, just out, is a number of years behind the science of the times, so we may easily imagine how very backward it will appear ten years hence.

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## THE PATH OF THE WATER CURRENT IN CUCUMBER PLANTS.

BY ERWIN F. SMITH.

Although Sachs' notion that the ascending water current in plants passes through the walls of the vessels and not through their interior, was rendered very doubtful long ago, if not thoroughly exploded, by the experiments of Elfving, Vesque, Erera, Boehm and others, the old statement still remains in many of the text books and continues to be taught. For this reason, and because the papers of the opponents of this view do not seem to have received much attention in this country, while Dr. Sachs' *Lectures on the Physiology of Plants* in H. Marshall Ward's admirable translation, is known and read everywhere and deservedly so, it may be worth while to call attention once more to the present state of our knowledge on this subject. This I shall do by presenting some experiments of my own, which were made a year ago on *Cucumis sativus* L. These were undertaken partly to verify some of Strasburger's statements in his book *Ueber den Bau und die Verrichtungen der Leitungsbahnen in den Pflanzen*, and partly to determine, as accurately as possible, the path of the water current in Cucurbitaceous stems, subject to the attack of *Bacillus tracheiphilus*. They were begun about March 20, and continued till some time in April, the weather being by turns warm and cold, sunny, windy, cloudy and rainy. About 30 well grown cucumber vines were experimented upon, the following being selected as typical. All were under glass in a large hot-house, devoted to the cultivation of cucumbers for the winter market. None of the vines trailed on the ground, but all were trained up on